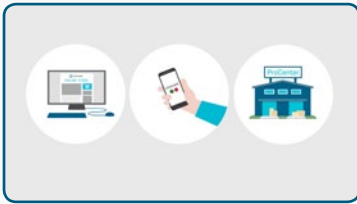


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CREATURE FEATURE

ROOF RAT



Like the Norway rat, the roof rat is an Old World rat native to Asia, specifically the forests of Southeast Asia. It also spread west through human migration, but it arrived in Europe and North America earlier than the Norway rat. Once the more aggressive Norway rat reached the United States, roof rats began to decline.

Whereas Norway rats are found in every state, roof rats tend to dominate in coastal cities or along waterways in warmer climates. Although they generally don't occur more than 100 miles inland, they may be transported inland and establish local infestations.

As their name implies, roof rats are arboreal and are more likely to infest higher structural areas, such as attics, soffits, drop ceilings and upper wall voids. They do very well in neighborhoods with mature landscaping - especially if it includes fruit and nut trees - and easily travel along fences, through trees, on utility lines and rooftops.

Roof rats are able to rely on natural food sources and aren't necessarily dependent on people for food.

The roof rat's arboreal nature means management methods must be placed higher than usual for Norway rats.

However, that doesn't mean that efforts shouldn't be made at ground level as roof rats will forage and sometimes dig burrows in dense vegetation. Snap traps and bait stations should be placed along travel routes marked by gnawing, droppings or rub marks. Many roof rats can be caught by securing traps or stations to the utility conduits they travel. They'll mostly be caught trying to bypass the traps.

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Want to learn more? Check out our Rodent Biology, Behavior & Management course online. [Visit PestWeb.com/ProTraining](http://PestWeb.com/ProTraining)

GERMAN COCKROACH RESISTANCE

Advertorial supplied by MGK



Managing cockroaches will always be an important part of pest management. Identifying the species correctly and then understanding its biology, behaviors and habitats is critical to control and eradication. An integrated approach should include identification, inspection and treatment, including resistance management.

Cockroaches, specifically German cockroaches, have a relatively short life cycle which means they can increase their populations exponentially in a short period of time. This makes them more likely to adapt or develop resistance to various control methods. There are several types of resistance that can occur: cuticular, target site, metabolic and behavioral.

- **Cuticular resistance** is when the structure of the cuticle or exoskeleton changes and the insecticides cannot penetrate the insect as easily. Often the cuticle or exoskeleton simply becomes thicker which slows absorption of the chemicals into their bodies.
- **Metabolic resistance** is when an insect increases the amount of enzymes it produces in order to break down toxicants or internally regulate hormone systems. This can happen in the internal body cavity of the insect and even in the cuticle itself. Metabolic resistance enables the insect to better metabolize the insecticide, making it less effective.
- **Target site resistance** is a DNA change at an insecticide binding site. If the insecticide normally binds to a specific protein on the sodium channel of the nervous system and that site has changed its structure, the insecticide may only weakly bind to it or not be able to bind at all, reducing the effectiveness of the insecticide.
- **Behavioral resistance** is when an insect senses the insecticide and can adapt to avoid it. For example, cockroaches excel at learning to associate smells with specific tastes. Even though they may prefer sweet (different sugars are often found in bait matrices), some studies indicate that they can evolve their taste buds to make sweet taste bitter. As a result, they avoid the baits and continue to thrive in their environment.

In the ongoing battle between cockroaches and humans, there are several tools to help combat the various forms of resistance: multiple modes of action, multiple synergists and insect growth regulators.

- **“Mode of action (MOA)”** refers to the specific target affected in the insect (e.g. sodium channel inhibitor).

Having multiple MOAs may delay resistance in cockroaches because the mechanisms required to resist insecticides may not be widespread or it may be difficult for them to develop resistance to several at one time.

- **Synergists are not effective by themselves**, but enhance the effectiveness of other active ingredients. Two common synergists are piperonyl butoxide (PBO) and MGK® 264®. Both synergists bind to enzymes in the cockroach body that would normally break down adulticides, preventing the cockroach from detoxifying them. They can also act as solvents, enhancing penetration of the cuticle in the case of cuticular resistance.
- **Insect growth regulators** mimic juvenile hormones in cockroaches, which prevents them from maturing into reproducing adults. Even if the cockroach has developed target site resistance to an insecticide that works on the nervous system, that won't affect the efficacy of an insect growth regulator and maturation and reproduction will still be affected.

Shockwave® 1 Flushing, Killing and Residual Aerosol by MGK® works hard in the fight against cockroaches so you don't have to. It contains two adulticides and an insect growth regulator that flush the cockroaches out of hiding, kill and leave a residual for long-term control. In addition, it contains two synergists that enhance the effectiveness of the other active ingredients and help combat resistance. This all-in-one aerosol with multiple modes of action offers convenience and improved cockroach control, wherever you need it.





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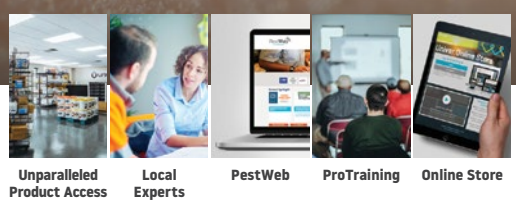
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